A cyclist accelerates at a rate of 7.0 m/s/s. How long will it take the cyclist to reach a speed of 18 m/s if he starts from rest?

$$\bar{a} = \frac{\bar{v}_f - \bar{v}_i}{t_f - t_i}$$

$\rightarrow +$

$a = {}^{+}7\ m/s^2 \rightarrow$

$\bar{v}_i = 0\ m/s \qquad \bar{v}_f = {}^{+}18\ m/s$

$t_i = 0\ s \qquad t_f = ?$

$$\bar{a} = \frac{\bar{v}_f}{t_f}$$

$$\left[\bar{a} = \frac{\bar{v}_f}{t_f}\right] t_f$$

$$\left[\bar{a} t_f = \bar{v}_f\right] \frac{1}{\bar{a}}$$

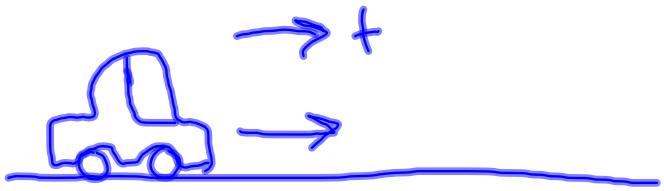
$$t_f = \frac{\bar{v}_f}{\bar{a}}$$

$$t_f = \frac{\bar{v}_f}{\bar{a}}$$

$$= \frac{{}^{+}18\ m/s}{+7\ m/s^2}$$

$$= 2.57\ s$$

A car pulls the emergency hand brake, decelerating at -4.0 m/s/s for 7.5 s to a complete and total stop. What was the initial velocity the car was traveling at before the brake was pulled?



$$\bar{a} = \frac{\bar{v}_f - \bar{v}_i}{t_f - t_i}$$

$\bar{a} = -4.0\ m/s^2$

$\bar{v}_i = ?$ $\quad \bar{v}_f = 0\ m/s$

$t_i = 0\ s$ $\quad t_f = 7.5\ s$

$$\bar{a} = \frac{-\bar{v}_i}{t_f}$$

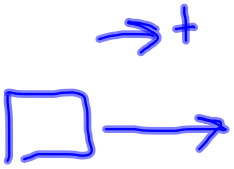
$$\bar{a}\, t_f = -\bar{v}_i$$

$$v_i = -\bar{a}\, t_f$$

$$= -(-4\ m/s^2)(7.5\ s)$$

$$= 30\ m/s$$

A spaceship has an initial velocity of 1000 m/s and slows to a complete stop. If the acceleration is -125 m/s/s, how much time did it take to come to the stop?



$\bar{a} = -125\ m/s^2$

$\bar{v}_i = +1000\ m/s$ $\quad \bar{v}_f = 0\ m/s$

$t_i = 0\ s$ $\quad t_f = ?$

$$\bar{a} = \frac{\bar{v}_f - \bar{v}_i}{t_f - t_i}$$

$$\bar{a} = \frac{-\bar{v}_i}{t_f}$$

$$t_f = \frac{-\bar{v}_i}{\bar{a}}$$

$$= \frac{-(1000\ m/s)}{-125\ m/s^2}$$

$$= 8\ s$$